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SUBJECT X-Ray Testing Apparatus Industry

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SUBJECT X-Ray Testing Apparatus Industry

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1. The Hungarian national factory "Röntgen és Orvosi Készülékek Gyára" (X-Ray Apparatus and Medical Equipment Factory) manufactures various kinds of X-ray apparatus which are exported in large quantity to Turkey and the Near East. Orders frequently can be filled only after long delays, because factory production is hampered by shortages of raw materials. Since metals for X-ray apparatus no longer can be procured abroad, the factory has been obliged since the spring of 1953 to make the casing of the 2-6 KW X-ray tube itself, from domestic raw materials. Consignments of X-ray apparatus parts amounting in value to over 4 million forints have been required. The stoppage of deliveries from abroad has caused a great deal of trouble.
2. Further difficulties in the manufacture of testing apparatus arise because not enough ball bearings can be had. In order to carry on production of the various X-ray apparatus in these circumstances, it has been necessary for some months to use substitutes which have not been tried previously.
3. The "Budapesti Kábel- és Söronykötélgyár" (Budapest Cable and Rope Works) has been given a joint order with the X-ray factory for the manufacture of casings for X-ray tubes for therapeutic purposes. The "Magyar Adócsőgyár" (Hungarian Radio Tube Factory) has been directed to keep the factory supplied with sufficient quantities of X-ray tubes and diagnostic valve tubes. These adjustments have been made in order to save foreign orders amounting to 3 million forints. Informant is told that it is almost impossible to buy these parts in the West under present conditions.

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4. Much more important than the trade in medical X-ray apparatus however is the exportation of portable X-ray apparatus for testing the structure of metals in heavy industry and war materials production. The factory makes several kinds of such testing apparatus. In Hungary the "Mobil M" apparatus is used not only in the metallurgical industries, but also in the ceramic industry for testing the big insulators for high-voltage current, for safety fuses and cables.
5. This testing equipment is manufactured in four models: M2, M3, M4 and M4-Special. All four are exported.
6. The "Mobil M2" apparatus consists of three units. It is a single tank-half wave apparatus. The power output of the "M2" and "M3" apparatus amounts to 15 mA with a maximum load of 250 kV, or as the case may be, 30 mA with 100 kV; between 150 and 170 kV, 20 mA. The limits of thickness of materials for attainable reception ^{Fig 7} are also the same with both models: for copper, 70 mm; iron, 100 mm; aluminum, 400 mm. The actual practical limits of the apparatus naturally depend also on other factors, such as the alloying of the metal.
7. The three units of the "Mobil M2" are the common grounded single-tank body for high voltage transformer and X-ray tube, the switchboard, and the cooling pump. Accessory items are the flexible armored tube and cooling-oil pipes.
8. The shaft journal of the tank is attached with ball bearings to the supporting post of the track, which is provided with spiral steel springs. The arrangement of the steering-wheel-like worm gear makes it possible for the tank to be rotated through the longitudinal-running vertical plane. The high voltage transformer is in the lower and larger part of the tank, which also contains the filament transformer for actuating the hot cathode of the X-ray tube. The upper and smaller part of the tank contains the X-ray tube. The sensitive tube is enclosed in a metal cylinder open at both ends with a 6 mm, 1/4" thick lead lining, the so-called potential cylinder. There are cooling coils in both compartments, supplying cooling oil to the X-ray tube.
9. Exhausted tubes are easily and quickly changed. The rollable switchboard is a metal covered, iron bound box. The controls for the entire apparatus are located on the cover plate; the measuring instruments, the setting devices and the operating switch. The synchronous motor-time switch for setting the time of exposure works automatically. The operating switch starts the cooling motor; the various circuits are all controlled by a single switch. The voltage of the X-ray tube can be adjusted continuously from about 80 to 260 kV. The apparatus is protected from dust and dirt by a cover.
the
10. The jacketed radiator coil is a modern technical device. The tubes run into the lower, cylindrical-shaped oil tank of the cooling motor. The warmed oil runs back into the tank through the inner tube while the cooling water circulates through the outer tube. The right oil level is high enough so that the cooling pipes are covered.
11. The "Mobil M3" apparatus consists of six units and is a more modern type than the M2. The switchboard and oil pump are the same as in the M2. The outstanding difference is that in the M3 the X-ray tube is mounted in an independent hood and carried on a separate support. The transformer is in two halves and therefore more easily transportable. The connection between the

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two poles and the anode and cathode-side transformers is by means of flexible, voltage-fuse-protected rubber cables. The M3 apparatus is more mobile and more easily transportable than the M2. The oil chamber of the anode transformer contains a high voltage condenser, a valve tube and a protective resistance bleeder for the X-ray tube. The various parts can be changed quickly and easily.

12. The two apparatus are quite different in outward appearance. The X-ray tube support of the M3 is movable. The protective cover can be slid in various directions. The cover is protected against radiation and contact. It is connected with the two transformers by a high voltage rubber cable and with the cooler by oil pipes. The time of exposure is specified by diagrams.
13. The "M4" and "M4 Special" models are for testing cylindrically-shaped material. These models are still more mobile. Both are of single transformer construction. The X-ray tubes are unipolar. They are inexpensive. They can also be used for such materials as are not accessible to bipolar tubes on account of their shape. The second pole is grounded. The "M4 Special" radiates circularly and is only suitable for rapid testing of cylindrical specimens. The all-around picture coverage exposes material defects at all points of the sample being tested.
14. The "Mobil M4" has a lateral-radiating unipolar tube and allows the testing by transillumination of special-shaped pieces.

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